

**Sustainability: The Next Step**  
**Estimating the University of Wisconsin –**  
**Green Bay’s Carbon Footprint**

Chapter 3  
Scope 3 – Other Indirect Emissions

**University of Wisconsin-Green Bay**  
**Seminar in Environmental Science & Policy**  
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Adam Baldwin  
Bill Oldenburg  
Bethany Reinholtz  
Tracy Valenta

## **Introduction**

The third scope to the Campus Carbon Calculator is the focus of this chapter and identifies other indirect emissions associated with UW-Green Bay that have not been identified in Scope 1 or Scope 2. Specifically, this category...“refers to all other indirect emissions, including those generated from commuting to and from campus, institution air travel, waste disposal, the production of purchased products, and more.” (ACUPCC 2007). Scope 3 was only partially completed due to time constraints.

Once again, this part of the green house gas inventory attempts to reach back to 2001 and accounts for all properties owned by UW-Green Bay as well as on-campus dormitories and apartments as identified in Scope 2. There is a significant amount of electricity that is used in the pumping and treating of drinking water that is consumed by UW-Green Bay. There is also a significant amount of energy in the form of electricity, natural gas, and small amounts of fuel oil that are necessary to treat the wastewater discharged from the campus to the Green Bay Metropolitan Sewerage District (GBMSD). In addition, information associated with the various forms of commuting was included in the scope.

Further work is needed to procure the necessary information associated with institutional air travel, solid waste disposal with associated landfill information, as well as any other information that is available identifying the consumption of fossil fuels for the benefit of the university.

## Data Collection - Drinking Water

Campus water usage was procured, once again, through contact with Chris Hatfield. Mr. Hatfield provided Microsoft Excel spreadsheets detailing all university water usage (see Appendix 1) for fiscal years 2001-2007 except for fiscal year 2002. The mean between 2001 and 2003 was used as a replacement. Water usage for 2007 was provided in cubic feet and was then converted to gallons.

Water usage for 2001-2006 was calculated differently. The spreadsheets for these time periods only tracked dollars and not actual gallons. 2007 was used as a base year in order to calculate gallons consumed in previous years as follows:

$$2007: \$61,209 \text{ total } \$ \text{ water} / 4,220,136 \text{ ft}^3 \text{ purchased} = \$0.014504035/\text{ft}^3$$

$$2006: \$54,344.30 \text{ total } \$ \text{ water} / \$0.014504035/\text{ft}^3 = 3,746,840 \text{ ft}^3$$

$$3,746,840 \text{ ft}^3 \times 7.48 \text{ gallons}/\text{ft}^3 = 28,026,364 \text{ gallons total}$$

This calculation was used for 2001-2006 fiscal years. The assumption was made that the cost of one cubic foot of water was static each year. Accuracy can be improved if the actual cost of one cubic foot of drinking water could be determined for each year in question.

Residence Life provided water usage for the dormitories and apartments from 1998 through 2007 and was procured through contact with Steve Gering. This information can be found in Appendix 5. Since campus water usage was only available

2001 to current, the same time period was used for Residence Life. This data was provided in cubic feet and was then converted to gallons.

The volume of drinking water consumed at UW-Green Bay each year then needed to be converted to kWh in order to be used in the Campus Carbon Calculator. Russ Hardwick, Water Quality Manager for the Green Bay Water Utility provided annual water volumes and annual kWh used in all facets of the drinking water treatment process from collection from Lake Michigan to final delivery to the consumer. This information, as well as the associated calculations, can be found in Appendix 6. With this information, a ratio of gallons of drinking water per kWh was established as follows:

2006:  $6,577,057,000$  gallons pumped/ $12,388,607$  kWh used =  $530.90$  gallons/kWh

This number was then divided into the total gallons of drinking water purchased each year by the UW-Green Bay campus deriving the total kWh each year. This same calculation was used to derive the kWh for Residence Life. The annual totals for campus and Residence Life were then added together for a grand total and this number was used in the Campus Carbon Calculator.

There was one significant assumption made through the derivation of kWh associated with the consumption of drinking water. The annual totals from the Green Bay Water Utility and Residence Life are based on a January 1 to December 31 fiscal year and, as stated above, UW-Green Bay campus totals are based on a fiscal year July 1-June 30. The assumption that was made was the ending year of a campus fiscal year was used with the calendar fiscal year for the Green Bay Water Utility and Residence Life.

As an example, campus fiscal year 2005-2006 was used with 2006 Green Bay Water Utility and Residence Life data.

### **Data Collection – Wastewater**

UW-Green Bay campus wastewater discharges were procured through a review of monthly water/wastewater invoices at the office of Chris Hatfield. This information was readily available from 2003 through 2007. Information prior to 2003 will require significant effort to review archived documents located in storage. Wastewater data was reported in cubic feet and was then converted to gallons. Residence Life annual wastewater discharges are identical to water consumption. This is based on the assumption that each gallon of drinking water “consumed” ultimately finds its way to the sewerage system.

GBMSD treats the wastewater discharged from campus and Residence Life and uses electricity, natural gas, and small amounts of fuel oil in the wastewater treatment process. Using the same calculations identified above for drinking water, electricity was converted to gallons of wastewater/kWh, natural gas was converted to gallons of wastewater/MMBtu, and fuel oil converted to gallons of wastewater/gallon of fuel oil. Each of these annual ratios was divided into the total annual wastewater discharged from both campus and Residence Life. The resulting number was then put in the Campus Carbon Calculator.

GBMSD has the same fiscal year as the Green Bay Water Utility and is shifted six months from the UW campus. Therefore, the same assumption is made with respect to matching fiscal years as identified above.

The CA-CP campus carbon calculator does not provide an input area for electricity usage from drinking water and wastewater. As a result, all electricity usage for drinking water and wastewater has been added into the total electricity usage under scope 2. Also, all natural gas and fuel oil usage for drinking water and wastewater have been added to the total natural gas and distillate oil usage under scope 1.

### **Data Collection – Commuters**

Information for this section of Scope 3 was procured through a review of the 2005 Capstone project titled “Building on the UW-Green Bay Master Plan: Promoting Sustainability” within the Transportation Management section (Dybas, Janesh, Kelly, Rudolph 2005).

## Works Cited

American College & University Presidents Climate Commitment. Implementation Guide-Draft for Comment Version 1.0. June 13, 2007.

Dybas, Angel, Barbara Janesh, Jennifer Kelly, Luann Rudolph. Building on the UW-Green Bay Master Plan: Promoting Sustainability-Transportation Management. December 13, 2005.